

**KEYBOARD WITH ADAPTIVE INPUT ROW****CROSS-REFERENCE TO RELATED APPLICATION(S)**

**[0001]** This application is a nonprovisional patent application of U.S. Provisional Patent Application No. 62/234,950, filed Sep. 30, 2015 and titled “Keyboard with Adaptive Input Row,” the disclosure of which is hereby incorporated herein by reference in its entirety.

**FIELD**

**[0002]** The described embodiments relate generally to user-input devices. More particularly, the present embodiments relate to an adaptive input row for receiving various types of user input.

**BACKGROUND**

**[0003]** Traditionally, user input to a computer system includes a keyboard having dedicated keys or buttons. The operation of each key or button may be tied to a particular function or command. However, traditional keyboard systems lack the flexibility to accommodate expansive features offered by newer devices, operating systems, and software. A traditional keyboard may include some keys that may be used to perform multiple or alternative functions by pressing the key at the same time as a “shift” or “function” button. However, such configurations provide limited flexibility and can be awkward or non-intuitive for a user to operate.

**SUMMARY**

**[0004]** Some example embodiments are directed to an electronic device having an adaptive input row. The device may include a housing that defines an opening and an adaptive input row that is positioned within the opening. The adaptive input row may include a cover for receiving a touch, and a display positioned below the cover and configured to present an adaptable set of indicia. The adaptive input row may also include a touch sensor configured to detect the location of the touch, and a force sensor configured to detect a magnitude of a force of the touch. The device may also include a set of keys positioned proximate to the adaptive input row. In some embodiments, the adaptive input row is positioned adjacent to a number row of the set of keys.

**[0005]** In some embodiments, the device may also include a processing unit positioned within the housing, and a primary display positioned at least partially within the housing and configured to display a graphical-user interface executed by the processing unit. In some embodiments, the display is an organic light-emitting diode display. The electronic device may be a keyboard device.

**[0006]** In some embodiments, multiple user-input regions are defined along a length of the cover. A first user-input region of the multiple user-input regions may be responsive to the touch in a first input mode, and may not be responsive to the touch in a second input mode.

**[0007]** In some embodiments, the force sensor is positioned below the display. The force sensor may include a pair of capacitive electrodes separated by a compressible layer. In some embodiments, the force sensor is configured to provide a seal to prevent an ingress of moisture or liquid into an internal volume of the adaptive input row. In some embodiments, the pair of capacitive electrodes is a first pair

of capacitive electrodes disposed at a first end of the display. The adaptive input row may also include a second pair of capacitive electrodes disposed at a second end of the display. In some embodiments, the electronic device further comprises sensor circuitry operatively coupled to the first and second pairs of capacitive electrodes. The sensor circuitry may be configured to output a signal that corresponds to a location of the touch on the cover based on a relative amount of deflection between the first and second pairs of capacitive electrodes.

**[0008]** In some embodiments, the force sensor is positioned below the display. The force sensor may include an array of force-sensitive structures arranged along a length of the adaptive input row.

**[0009]** Some example embodiments are directed to a user input device that includes a set of alpha-numeric keys, and an adaptive input row positioned adjacent the set of alpha-numeric keys. The adaptive input row may include a cover, a display positioned below the cover, and a sensor configured to detect a location of a touch on the cover. The display may be configured to display a first set of indicia when the device is operated in a first output mode. Touch output from the sensor may be interpreted as a first set of commands when in the first input mode. The display may be configured to display a second set of indicia when the device is operated in a second output mode. Touch output from the sensor may be interpreted as a second set of commands when in the second input mode. In some embodiments, the adaptive input row includes a touch-sensitive region that extends beyond a display region positioned over the display.

**[0010]** In some embodiments, a set of programmably defined regions is defined along a length of the adaptive input row. The first and second sets of indicia may be displayed over the same set of programmably defined regions. In some embodiments, the first set of indicia includes an animated indicia that is responsive to the touch on the cover.

**[0011]** In some embodiments, the touch on the cover includes a touch gesture input in which the touch is moved across at least a portion of the cover. The touch may also include a forceful touch input in which the touch exerts a force that exceeds a threshold. The touch may also include a multi-touch input in which multiple touches contact the cover.

**[0012]** Some example embodiments are directed to an electronic device including a housing, a primary display positioned within a first opening of the housing, and a keyboard having a set of keys protruding through a set of openings in the housing. The device may also include an adaptive input row positioned within a second opening of the housing adjacent to the set of keys. The adaptive input row may include a cover forming a portion of an exterior surface of the electronic device and a display positioned below the cover. The adaptive input row may also include a sensor configured to detect a touch within a programmably defined region on the cover.

**[0013]** In some embodiments, the sensor comprises a capacitive touch sensor formed from an array of capacitive nodes. The programmably defined region may include a touch-sensitive area detectable by multiple capacitive nodes. In some embodiments, the sensor comprises a capacitive touch sensor configured to detect a touch gesture on the cover. Additionally or alternatively, the sensor may include